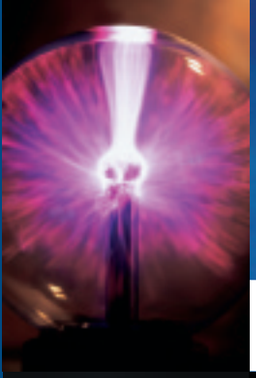
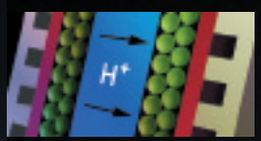
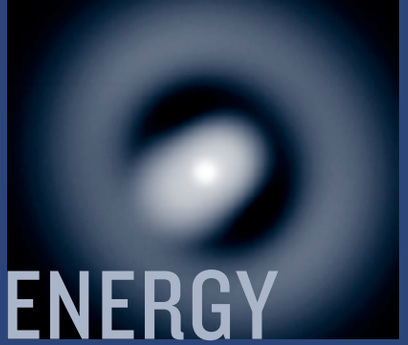


NEXTENERGY





NEXTENERGY

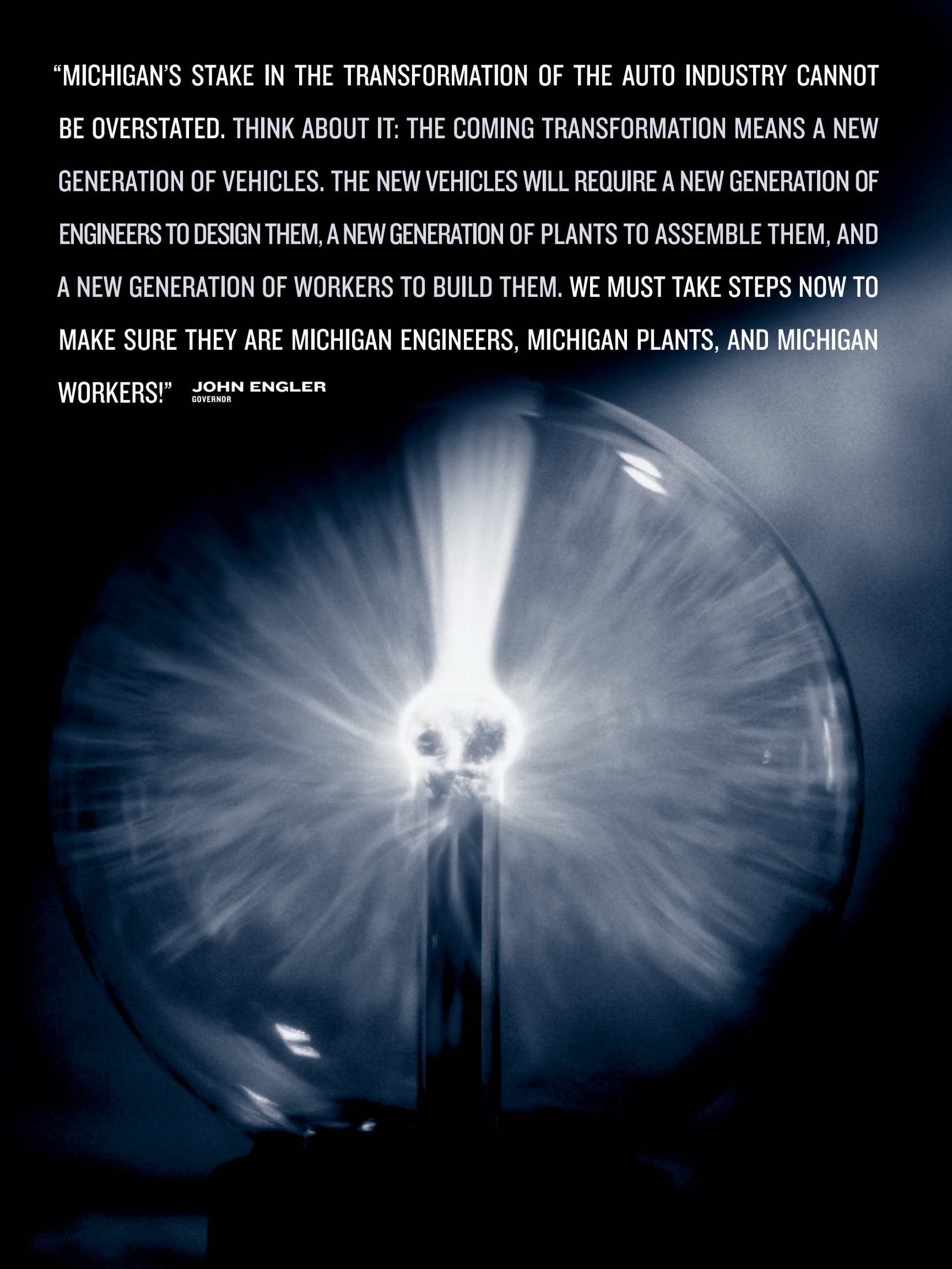
AN ECONOMIC DEVELOPMENT STRATEGY FOR THE NEXTMICHIGAN

Demand for energy is increasing as America's reliance on foreign oil is growing. Our continued reliance on non-renewable energy sources increases security risks to the nation, threatens our mobile lifestyle, degrades our environment and hurts our economy.

NextEnergy is a comprehensive set of actions and incentives designed to position Michigan as the world's leading center for alternative energy technology, research and development, education and manufacturing. Technologies for both mobile and stationary applications using renewable and distributed energy[1] solutions will be supported. NextEnergy stakes Michigan's position to be the world leader in one of the defining industries of the new century and reap the economic growth that will result.

[1] Distributed generation means the use of a single generation device (not exceeding 2MW) or an interconnected combination of generation devices (not exceeding 10MW).

"MICHIGAN'S STAKE IN THE TRANSFORMATION OF THE AUTO INDUSTRY CANNOT BE OVERSTATED. THINK ABOUT IT: THE COMING TRANSFORMATION MEANS A NEW GENERATION OF VEHICLES. THE NEW VEHICLES WILL REQUIRE A NEW GENERATION OF ENGINEERS TO DESIGN THEM, A NEW GENERATION OF PLANTS TO ASSEMBLE THEM, AND A NEW GENERATION OF WORKERS TO BUILD THEM. WE MUST TAKE STEPS NOW TO MAKE SURE THEY ARE MICHIGAN ENGINEERS, MICHIGAN PLANTS, AND MICHIGAN WORKERS!" **JOHN ENGLER**
GOVERNOR



BUSINESS CASE

THE BUSINESS CASE FOR NEXTENERGY CAN BE SUMMARIZED IN TWO BROAD CATEGORIES, ECONOMICS AND ENVIRONMENT.

ECONOMICS

Today, America is more dependent upon foreign oil than it was during the *oil shock* of the 1970's. Each day Americans consume 10 million barrels of foreign oil and that amount is projected to increase. It is estimated that passenger vehicles alone consume 6 million barrels of oil every single day, equivalent to 85 percent of oil imports.[1] The complexity and uncertainty of world events demand that we take control of our own destiny in terms of energy reliance. We must have a reliable and affordable energy supply to fuel our economy.

From a state perspective, no other region in the world is more recognized as the global automotive center than Michigan and possibly no other state in the nation has as much at stake. The advent of a new power system replacing the internal combustion engine puts Michigan at risk of losing as many as 100,000 to 200,000 jobs.[2] According to a study completed by the Center for Automotive Research in August 2001, there are currently 27,000 people employed at engine and transmission plants across Michigan, and thousands more at suppliers who manufacture parts or components such as pistons, valves, and camshafts that are integral to the traditional internal combustion engine-powered automobile. Michigan has 34.5 percent of engine manufacturing and 39.1 percent of automatic transmission manufacturing in North America.

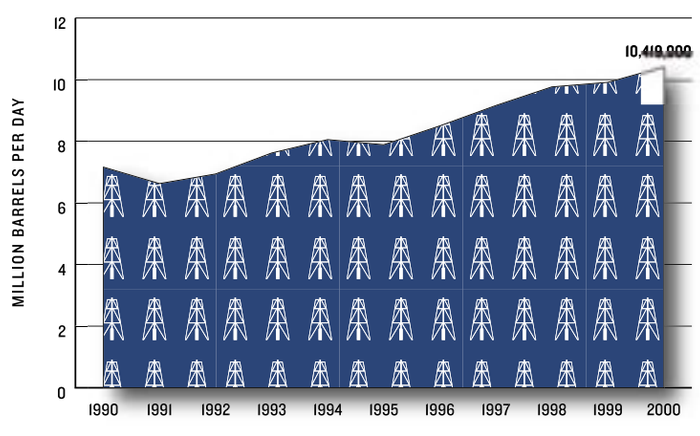
MICHIGAN ENGINE PRODUCTION AS A PERCENT OF NORTH AMERICAN ENGINE PRODUCTION

	Total engine production	Michigan engine production	Michigan percent of total production
4-Cylinder	5,811,469	938,120	17.7%
6-Cylinder	6,138,995	1,996,410	32.5%
8-Cylinder	4,518,609	2,595,680	57.4%
10-Cylinder	115,454	17,785	15.3%
All Engines	**16,054,618**	**5,547,995**	**34.5%**

SOURCE: HARBOUR REPORT 2000

The introduction of a new alternative fuel system such as fuel cells opens the door to a whole new realm of possibilities for automotive designers and engineers. One needs only look to the recent AUTOnomy concept car introduced by General Motors or DaimlerChrysler's Natrium, or Ford Motor Company's Focus FCV at this year's International Automobile Show in Detroit to get a glimpse of what the future may hold. These vehicles lacked the need for the transmission, pistons, valves and other parts Michigan is so good at producing.

UNITED STATES' DEPENDENCY ON OIL IMPORTS GROWS TO OVER 10 MILLION BARRELS PER DAY



Source: U.S. Department of Energy

[1] Fuelcells.org

[2] Center for Automotive Research

ENVIRONMENT

Our environment is a precious resource and in Michigan we are even more aware of that fact given our magnificent Great Lakes. The environment that we leave for our children and generations to come is a legacy we must get right. For decades the debate has centered on the premise that to protect or improve our environment, we had to change our way of living. Now it appears that technology may offer us the chance to improve our environment while perserving our way of life.

For example, at the national level, debate continues over effectiveness of using CAFE standards. While no one debates the laudable goal of CAFE standards, it's apparent that the American public prefers SUV's and a wide choice of vehicles that reduce the overall fuel economy. This inherent struggle has gone on for decades. Automobile manufacturers are bringing a variety of products to market to improve the efficiency of the internal combustion engine in the short-term such as hybrids and clean diesel. The long-term solution is an alternative fuel system that realizes dramatic energy efficiency and environmental benefits such as fuel cells.

The U.S. Department of Energy estimates that regulated air pollutants would be reduced by one million tons per year and sixty million tons of greenhouse gas carbon dioxide would be eliminated if 10% of automobiles nationwide were fuel cell powered. The only emission from a hydrogen fuel cell vehicle is H_2O—water.

Fuel cells are electrochemical devices, and by their vary nature have a more efficient conversion process: chemical energy is converted directly to electrical energy. Internal combustion engines are less efficient because they include the conversion of thermal to mechanical energy.[1]

It's time for outside the box thinking to produce the next leapfrog innovation in the field of alternative fuel technology and it's time for Michigan to lead the way. We did it at the turn of the century by inventing mass production, during WWII as the arsenal of democracy, and now it is time for us to do it again by enabling our nation to become energy independent. Our rich tradition of innovation, manufacturing technology, and human spirit have shown time and again that Michigan never backs down and always delivers.

It's time for NextEnergy!

[1] Thomas and Zalbowitz, Fuel Cells—Green Power, Los Alamos National Laboratory, New Mexico

ALTERNATIVE ENERGY TECHNOLOGY

Alternative energy technology is the research, development, manufacturing and integration of products, materials and processes that create energy from fuels that are renewable or waste sources. Alternative energy technology reduces levels of harmful pollutants and significantly reduces overall fossil fuel consumption. Examples of alternative energy technologies include:

Fuel cells and related components

Fuel cell powered vehicle or stationary power source

Alternative fuel internal combustion engine

Battery powered or hybrid vehicles

Photovoltaics

Wind and solar energy

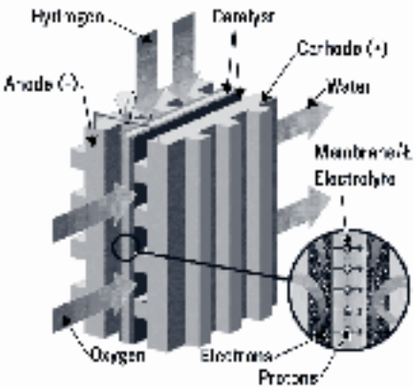
WHAT ARE FUEL CELLS?

William Grove, a British jurist and amateur physicist first discovered the principles of the fuel cell in 1839. But it took over 120 years before NASA showed their potential by using fuel cells as a power source for space travel. Now as the 21st century begins to unfold, fuel cells may replace the internal combustion engine.[1]

Simply defined, a fuel cell is an electrochemical energy conversion device. It produces electricity, water, and heat using fuel and oxygen in the air. A fuel cell is two to three times more efficient than an internal combustion engine in converting fuel to power. A fuel cell produces electricity, water, and heat using fuel and oxygen in the air. Water is the only emission when hydrogen is the fuel.

As hydrogen flows into the fuel cell on the anode side, a platinum catalyst facilitates the separation of the hydrogen gases into electrons and protons (hydrogen ions). The hydrogen ions pass through the membrane (the center of the fuel cell) and, again with the help of a platinum catalyst, combine with oxygen and electrons on the cathode side, producing water. The electrons, which cannot pass through the membrane, flow from the anode to the cathode through an external circuit containing a motor or other electric load, which consumes the power generated by the cell.

The voltage from one single cell is about 0.7 volts—just about enough for a light bulb—much less a car. When cells are stacked in a series, the operating voltage increases to 0.7 volts multiplied by the number of cells stacked.[2]



There are three primary market segments for fuel cells: the stationary applications, such as that used to power a cellular phone tower in an isolated location or power a home; the specialty or premium market used to power a laptop computer or cell phone; and the transportation market used to power an automobile or bus.[1]

[1] Michigan Economic Development Corporation

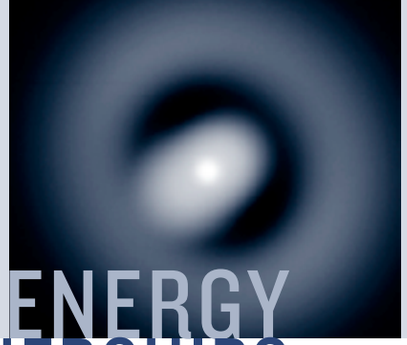
[2] Thomas and Zalbowitz, Fuel Cells — Green Power, Los Alamos National Laboratory, New Mexico

NEXTENERGY

Most Industry experts believe that fuel cells are America's long-term answer to its energy needs. NextEnergy is designed to dramatically accelerate the commercialization of this technology, while also supporting interim alternative energy strategies to transition our economy to this solution.

NextEnergy is a bold approach to ensure the economic future for generations to come in Michigan while also contributing to the national efforts to reduce our dependence on foreign oil. NextEnergy's primary objectives are to:

- Make Michigan the world center for alternative energy education, research, development and manufacturing for both mobile and stationary sources
- Make Michigan the world center for power electronics and other enabling technologies required by alternative energy to control and operate the automobiles and power sources of the future
- Significantly reduce Michigan's and America's dependence on foreign oil
- Dramatically improve Michigan's and America's energy efficiency and reduce air pollution



NEXTENERGY PARTNERSHIPS

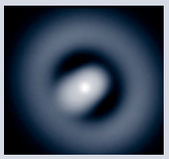
A COLLABORATIVE PROCESS

NextEnergy will bring great minds and great institutions together to develop cutting edge innovations. By creating an environment that nurtures innovation, entrepreneurial risk-taking, research and development, and the sharing of knowledge in one location, synergism will be created among partners in NextEnergy such as the Federal government including the U.S. Departments of Energy, Defense, Commerce, and Transportation, the Environmental Protection Agency, and the U.S. Army Tank-automotive and Armaments Command (TACOM). The university and community college system across Michigan would become involved in NextEnergy especially in the development of new curriculum, degree programs and collaborative industry research and commercialization. The private sector will be an integral component of NextEnergy with full participation of core industries critical to technology development, including the automotive, chemical, energy, utility, and agricultural sectors.

In addition, other national and international partners will be invited to join NextEnergy to share ideas and best practices across the globe.

“THE 20TH CENTURY WAS THE CENTURY OF THE INTERNAL COMBUSTION ENGINE. THE 21ST CENTURY WILL BE THE CENTURY OF THE FUEL CELL.”

RICK WAGONER
CEO, GENERAL MOTORS



THE MAJOR COMPONENTS OF NEXTENERGY INITIATIVE INCLUDE:

I

Establishing the NextEnergy Center

II

Designating a Michigan NextEnergyZone to build an *industry cluster*

III

Obtaining a commitment from the federal government
to establish a federal research facility within the NextEnergy Center

IV

Providing incentives to alternative energy technology
companies that locate within Michigan

V

Adopting state polices that spur demand
for alternative energy technologies

VI

Appointing a Michigan NextEnergy Leadership Council

VII

Constructing alternative energy technologies demonstration
microgrids in Michigan

VIII

Implementing an alternative energy technologies
business development program

IX

Marketing Michigan as the location
for the alternative energy technologies industry

Details of NextEnergy components follow.

"FUEL CELLS WILL MEAN CONTINUED FREEDOM OF MOBILITY FOR AMERICANS, GREATER ENERGY INDEPENDENCE FOR OUR NATION, AND A CLEANER ENVIRONMENT FOR THE WORLD."

DIETER ZETSCHE
CEO, CHRYSLER GROUP

SOURCE: DELOITTE & TOUCHE

I. Establish the NextEnergy Center

The latest research in economic development and job creation indicate that long term success is the result of cooperative partnerships that focus on creating *clusters of innovation* that build on already established strengths. Other research to date indicates that there is no particular geographic location where the alternative energy technology industry has begun to cluster, neither from a research nor industry standpoint. A recent report prepared by Deloitte & Touche indicates that there is no concentration of research centers, development companies, suppliers, or government research centers anywhere in the world. Within North America some of the leading development-focused companies are concentrated within the Mid-Atlantic and Northeastern United States. As the global center of the automobile industry, Michigan has an opportunity to capture this position in the marketplace by creating the NextEnergy Center.

The NextEnergy Center will carry out a wide range of activities to accelerate the development of the alternative energy industry. Ranging from expanding basic research knowledge to hands-on industry development support. Specifically, the NextEnergy Center will:

a. Develop community college, undergraduate and graduate-level programs in power electronics, alternative energy enabling technologies, fuel cell technology and other related disciplines
b. Raise scholarship funds to increase the number of students enrolled in these programs at the university and community college levels
c. Fund faculty positions to fill critical research and knowledge gaps
d. Offer technical assistance and workshops to academia and industry to provide on-going advanced education
e. Fund industry-university collaborative research and commercialization projects
f. Fund an Alternative Energy Components/Power Electronics Center of Excellence to provide specialized training and assistance to industry
g. Assist universities and companies applying for federal research and commercialization funds, including providing state matching funds for such projects
h. Serve as a clearinghouse on alternative energy companies, programs, projects and developments around the world
i. Organize student internship and placement programs
j. Develop marketing programs to promote the industry to potential customers, students and the general public
k. Develop industry support services, such as marketing assessments, industry roundtables, collaborative research partnerships in conjunction with the Michigan NextEnergy Council
l. Establish industry accelerator programs, such as incubator space, shared laboratory facilities, conference centers

CONCEPTUAL NEXTENERGY CENTER LOCATED AT NEXTENERGY ZONE

II. Designate a Michigan NextEnergyZone to Build an "Industry Cluster"

A physical geographic location within Michigan will jump start effort to truly create an *industry cluster* where business, academia, and government can together create the next alternative energy technologies to power our homes, businesses and automobiles. The Michigan NextEnergyZone will be located in York Township south of Ann Arbor and strategically located in close proximity to the campus of the University of Michigan and Detroit Metropolitan Airport.

Features of the Michigan NextEnergyZone include:

a. Locate the NextEnergyZone at the state-owned York Township site
b. Dedicate funds for necessary site improvements, incubator and speculative building construction
c. Locate the NextEnergy Center in the Zone
d. Enact legislation to provide a refundable Small Business Tax (SBT) credit equal to the personal income tax generated by the payroll of companies located in the Zone
e. Designate the NextEnergyZone as a tax-free Renaissance Zone (fully abates all local and state property taxes)
f. Install an alternative energy microgrid to power the Zone

III. Propose the Establishment of a Federal Research Facility within the NextEnergy Center

While the Deloitte & Touche study revealed that the U.S. Department of Energy and other federal departments have a number of alternative energy related research efforts underway at labs across the United States, there does not appear to be a concentration of these efforts in any one single location. Nor does there appear to be a primary *systems integrator* that is taking an inter-disciplinary approach towards commercializing the knowledge being gained through these efforts.

The Deloitte & Touche study suggests that there will be a need in the near future to develop a common set of standards for stationary and mobile fuel cell technology in order to allow mass manufacturing of this technology. Michigan has a unique opportunity to attract a federal research facility to be located within the Michigan NextEnergy Center. This federal facility is envisioned to serve the following functions:

a. Act as an *Underwriters' Laboratory* to develop industry standards, certification systems and identification of research gaps and needs
b. Include a collaborative testing facility to offset onerous investment and permitting burdens
c. Fund collaborative industry/university research and development programs, focusing on systems integration and inter-disciplinary solutions
d. Serve as a national clearinghouse on alternative fuels research, development, and commercialization information
e. Sponsor national conferences and workshops to build visibility for the industry and share knowledge
f. Develop core curriculum in alternative energy technologies for colleges and universities

g. Deliver technical assistance workshops to industry and academia to promote the adoption of best practices
h. Serve as a policy forum to develop federal legislative, regulatory, and tax policies; model state and local regulatory policies; and infrastructure grid proposals that promote alternative fuel commercialization

IV. Provide Incentives to Locate the NextEnergy Industry in Michigan

Michigan has made significant progress in creating a business climate that is attractive to companies including cutting taxes over 31 times saving taxpayers more than $26.0 billion and even phasing out the SBT. But just because we have improved our general business climate and are the home of the automotive industry, we should not assume the alternative energy industry will become centered in Michigan. Michigan may have been named the #1 state in the nation for new business facilities and expansions for five years in a row by *Site Selection* magazine, but we cannot assume that our current business climate will simply attract this new breed of research and companies. Under the NextEnergy Initiative, legislation will be proposed and regulations will be reviewed to:

a. Exempt from the SBT any company (or subsidiary of an existing company) whose primary service or product is alternative energy research, development or manufacturing
b. Exempt from the personal property tax any company whose primary service or product is alternative energy research, development or manufacturing (including subsidiaries of existing Michigan companies) until 2012
c. Establish a Michigan NextEnergy Development Fund to seed venture capital funds, provide working capital and/or finance the construction of research, development or manufacturing facilities for alternative energy companies
d. Review Michigan environmental, utility and zoning regulations to establish a consistent permitting process for distributed generation and alternative energy facilities

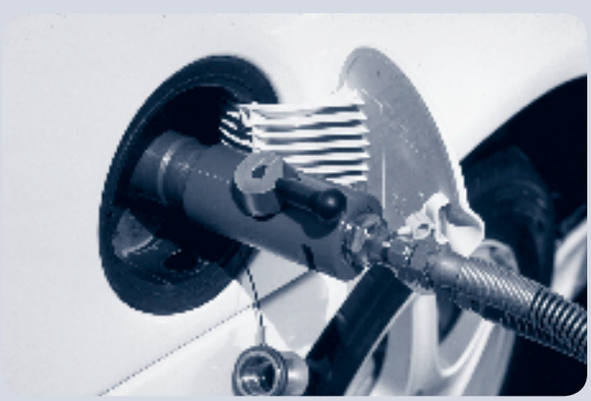
V. Adopt State Policies that Spur Demand for NextEnergy Technologies

As the saying goes, "if you're going to talk the talk, you had better walk the walk." As part of our efforts to make Michigan the global center of alternative energy technologies, we must create an environment where there is consumer demand for these innovative products and we must take steps to create the economies of scale needed to justify larger investments in these promising breakthroughs. Therefore, NextEnergy will encourage consumer end-use purchases of alternative energy technology products. In addition, we will demonstrate the viability of these technologies by directing the State of Michigan to use alternative energy technologies in their vehicle fleet and facilities. Specifically we will:

a. Enact legislation that exempts from the sales and use tax any purchases of stationary and vehicular devices using alternative energy technologies with a sunset in 2012

NATIONAL FACILITY	PRIME LOCATION
PACIFIC NORTHWEST NATIONAL LAB	RICHLAND, WA
ARGONNE NATIONAL LABORATORY	ARGONNE, IL
BROOKHAVEN NATIONAL LABORATORY	UPTON, NY
IDAHO NATIONAL ENGINEERING LAB	IDAHO FALLS, ID
LOS ALAMOS NATIONAL LABORATORY	LOS ALAMOS, NM
NATIONAL ENERGY TECHNOLOGY LABORATORY	MORGANTOWN, WVA
TACOM	**WARREN, MI**
NATIONAL RENEWABLE ENERGY LABORATORY	GOLDEN, CO
OAK RIDGE NATIONAL LABORATORY	OAK RIDGE, TN

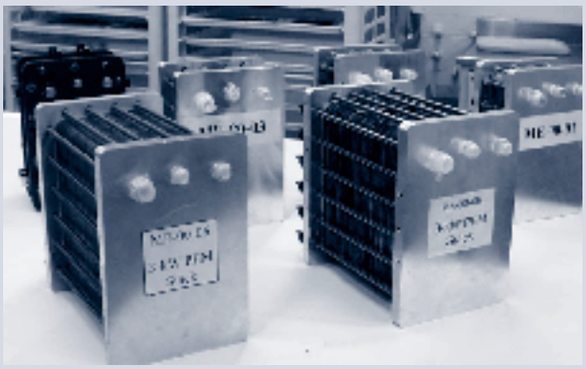
SOURCE: DELOITTE & TOUCHE



“I BELIEVE FUEL CELL VEHICLES WILL…END THE HUNDRED-YEAR REIGN OF THE INTERNAL COMBUSTION ENGINE AS THE DOMINANT SOURCE OF POWER FOR PERSONAL TRANSPORTATION.”

BILL FORD, JR.
CHAIRMAN AND CEO, FORD MOTOR COMPANY

b. Issue an Executive Directive charging Michigan Department of Transportation (MDOT) with developing an implementation plan for purchasing buses for mass transit fleets using emerging energy technologies
c. Issue an Executive Directive charging Michigan Department of Management and Budget (MDMB) with developing an implementation plan for purchasing alternative energy vehicles for the state fleet
d. Issue an Executive Directive charging MDMB with developing an implementation plan for purchasing energy from distributed generation sources for state facilities



VI. Appoint a NextEnergy Leadership Council

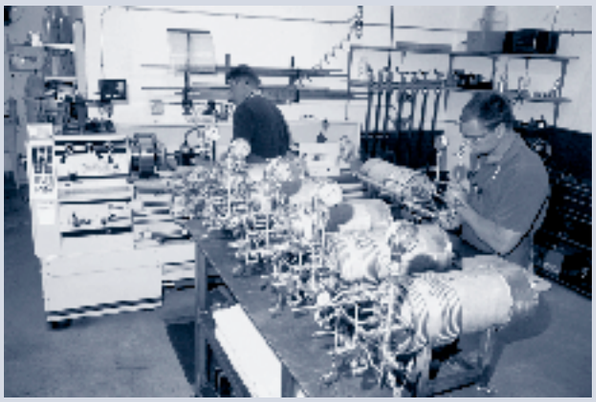
A high-level leadership council will be formed to provide advice and council on implementing the NextEnergy Initiative. The council will include representatives from industry, government, academia, and key associations. The council will be engaged in activities such as:

a. Developing recommendations for state programs or policies to promote alternative energy technologies, including workforce development, economic incentives, regulatory, and marketing initiatives
b. Providing input to the NextEnergy Center on programs that improve educational offerings at both the university and college levels
c. Facilitating student/worker placement programs
d. Promoting increased industry/university research collaboration
e. Suggesting industry support services that can be offered by the NextEnergy Center

VII. Propose Demonstration NextEnergy Microgrids be Constructed in Michigan

In order for businesses and consumers to fully appreciate and understand the revolutionary ways this technology will change the way we live and do business, it is proposed that demonstration microgrids be constructed in Michigan. Microgrids of power generated by fuel cells or other alternative energy technologies would demonstrate viable energy solutions. These microgrids would be designed and sited by taking the following steps:

a. Form a task force to design and support the construction of demonstration distributed energy microgrids for commercial development not adequately being served by the existing electric utility grid, a high density population center, or as a means of educating the public
b. Form a task force to design and support the construction of demonstration facilities for hydrogen production, storage, distribution, and refueling
c. Charge the microgrid and hydrogen task forces with proposing state legislation that facilitates siting of these facilities by establishing uniform state regulation and permitting standards



ASSEMBLY OF FUEL PROCESSORS

VIII. Implement a NextEnergy Business Development Program

As part of NextEnergy we will take advantage of the current business attraction efforts of the Michigan Economic Development Corporation and our network of local economic development organizations across Michigan. Recognized as the best statewide economic development organization in the nation, MEDC—working in concert with the NextEnergy Center—will be charged with attracting businesses to locate within the NextEnergyZone as well as in communities across the Great Lakes State. Key components of this program include:

a. Charge MEDC and the NextEnergy Center with calling on every Michigan company currently engaged in alternative energy research, development or manufacturing
b. Charge the NextEnergy Center with calling on the major domestic and international companies engaged in the alternative energy industry
c. Charge the NextEnergy Center with attracting at least one major stationary or mobile fuel cells development project that is either engaged in, or soon to be engaged in, production activities to Michigan

IX.Promote Michigan's NextEnergy Initiative

To support Michigan's drive to be the world's center for alternative energy technologies, the NextEnergy Center will launch an aggressive marketing initiative. The program will market and promote the fact that Michigan has made the long-term commitment to create a *cluster* focused on this critical industry. As we become successful in creating this cluster we will let the world know that Michigan is the dominant player in the alternative energy technologies industry. Efforts in this area will include the hosting of an International NextEnergy Conference bringing together the world experts in this field. Other efforts will include:

a. Developing online resource guides that inventory Michigan's alternative energy companies, suppliers, coalitions, industry associations, education programs
b. Establishing an annual awards and recognition program
c. Developing case studies that demonstrate Michigan's capabilities to retain and grow the industry
d. Developing advertising and public relations strategies to promote Michigan's business development efforts
e. Producing a Michigan NextEnergy Services Guide that outlines Michigan business programs and services tailored to the needs of this industry
f. Hosting an International NextEnergy Conference to bring international policy makers and scientists together to share innovations and use this conference as a forum for international, national and state leaders to develop new energy policy proposals

IMPLEMENTATION

NextEnergy is an aggressive approach to ensuring that Michigan becomes a global leader in alternative energy technologies. The Michigan Economic Development Corporation and the NextEnergy Center will be given the responsibility to enact the various components of the NextEnergy Initiative. Those responsibilities include:

I. Charge the Michigan Economic Development Corporation (MEDC) with:

a. Designing and implementing the NextEnergy Center
b. Developing a proposal to secure funding for a federal alternative energy research facility
c. Establishing the Michigan NextEnergy Leadership Council
d. Ensuring adoption of state policies to spur demand for NextEnergy technologies
e. Ensure adoption of state legislation and policies to establish NextEnergy business incentives

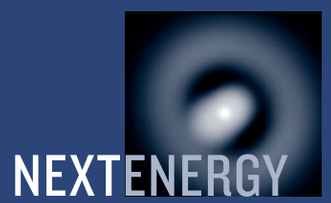
II. Charge the NextEnergy Center with:

a. Implementing Center programs and services
b. Securing federal support for a federal alternative energy research facility
c. Staffing the NextEnergy Leadership Council
d. Hosting the annual conference
e. Managing development of the NextEnergyZone
f. Leading Michigan's NextEnergy marketing, business development, and infrastructure demonstration programs

TECHNICIAN WORKING ON AN ALPHA 3 KILOWATT FUEL CELL SYSTEM

For more information on NextEnergy, call 517.373.9808 or visit us online at www.NextEnergy.org

PHOTOGRAPHS COURTESY OF FORD MOTOR COMPANY, GAS TECHNOLOGY INSTITUTE, AND IDATECH L.L.C.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